

## INTERNATIONAL SEARCH REPORT

national Application No

PCT/PT 03/00015

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01J31/04 B01J31/18 B01J31/22 B01J31/26 B01J31/36  
C07C51/145

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01J C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TANIGUCHI Y ET AL: "Highly Efficient Vanadium-Catalyzed Transformation of CH <sub>4</sub> and CO to Acetic Acid" ORGANIC LETTERS, ACS, WASHINGTON, DC, US vol. 1, no. 4, 8 July 1999 (1999-07-08), pages 557-559, XP002286128 cited in the application the whole document	1-4
A	NIZOVA G V ET AL: "Carboxylation of methane with CO or CO <sub>2</sub> in aqueous solution catalysed by vanadium complexes" CHEMICAL COMMUNICATIONS - CHEMCOM, ROYAL SOCIETY OF CHEMISTRY, GB, no. 17, 1998, pages 1885-1886, XP002286129 cited in the application the whole document	1-3
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the International filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the International filing date but later than the priority date claimed

- \*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*G\* document member of the same patent family

Date of the actual completion of the International search

25 June 2004

Date of mailing of the International search report

07/07/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Goebel, M

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>REIS P M ET AL: "Amavadine as a catalyst for the peroxidative halogenation, hydroxylation and oxygenation of alkanes and benzene"</p> <p>CHEMICAL COMMUNICATIONS - CHEMCOM, ROYAL SOCIETY OF CHEMISTRY, GB ,</p> <p>2000, pages 1845-1846, XP002286130</p> <p>cited in the application</p> <p>the whole document</p> <p>---</p>	1-3
A	<p>EP 0 560 656 A (SUMITOMO CHEMICAL CO)</p> <p>15 September 1993 (1993-09-15)</p> <p>claims; examples</p> <p>---</p>	1-4
A	<p>ASADULLAH M ET AL: "One-step carboxylation reaction of saturated hydrocarbons with CO by Co(OAc)<sub>2</sub> catalyst under mild conditions"</p> <p>APPLIED CATALYSIS A: GENERAL, ELSEVIER SCIENCE, AMSTERDAM, NL,</p> <p>vol. 194-195, 13 March 2000 (2000-03-13), pages 443-452, XP004272248</p> <p>ISSN: 0926-860X</p> <p>the whole document</p> <p>---</p>	1-4
A	<p>ASADULLAH M ET AL: "CaCl<sub>2</sub>-Catalyzed Functionalization of Saturated Hydrocarbons with CO to Carboxylic Acids and Esters"</p> <p>JOURNAL OF CATALYSIS, ACADEMIC PRESS, DULUTH, MN, US,</p> <p>vol. 195, no. 1,</p> <p>1 October 2000 (2000-10-01), pages 180-186, XP004437974</p> <p>ISSN: 0021-9517</p> <p>the whole document</p> <p>---</p>	1-4
A	<p>CRANS D C ET AL: "Vanadium(V)-Protein Model Studies: Solid-State and Solution Structure"</p> <p>JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, DC, US ,</p> <p>vol. 115, no. 15,</p> <p>28 July 1993 (1993-07-28), pages 6769-6776, XP002286131</p> <p>cited in the application</p> <p>page 6769 -page 6770</p> <p>---</p> <p style="text-align: center;">-/--</p>	3

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BERRY R E ET AL: "The Structural Characterization of Amavadin " ANGEWANDTE CHEMIE. INTERNATIONAL EDITION, WILEY-VCH VERLAG, WEINHEIM, DE , vol. 38, no. 6, 15 March 1999 (1999-03-15), pages 795-797, XP002286132 cited in the application the whole document ---	3
A	CARAVAN P ET AL: "Reaction Chemistry of BMOV, Bis(maltolato)oxovanadium(IV)-A Potent Insulin Mimetic Agent" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, DC, US , vol. 117, no. 51, 27 December 1995 (1995-12-27), pages 12759-12770, XP002286133 cited in the application page 12759 -page 12760; figures 1,2 ---	3
A	CHEN C-T ET AL: "Catalytic Nucleophilic Acyl Substitution of Anhydrides by Amphoteric Vanadyl Triflate" ORGANIC LETTERS, ACS, WASHINGTON, DC, US , vol. 3, no. 23, 20 October 2001 (2001-10-20), pages 3729-3732, XP002286134 cited in the application the whole document ---	3
A	HAMSTRA B J ET AL: "Structural and Solution Characterization of Mononuclear Vanadium(IV) Complexes That Help To Elucidate the Active Site Structure of the Reduced Vanadium Haloperoxidases" INORGANIC CHEMISTRY, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 36, no. 21, 8 October 1997 (1997-10-08), pages 4866-4874, XP002286135 cited in the application page 4866 -page 4867 ---	3
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	REIS P M ET AL: "Single-Pot Conversion of Methane into Acetic Acid in the Absence of CO and with Vanadium Catalysts Such as Amavadine" ANGEWANDTE CHEMIE. INTERNATIONAL EDITION, WILEY-VCH VERLAG, WEINHEIM, DE , vol. 42, no. 7, 17 February 2003 (2003-02-17), pages 821-823, XP002286136 the whole document -----	1-4
T	CRANS D C ET AL: "The Chemistry and Biochemistry of Vanadium and the Biological Activities Exerted by Vanadium Compounds" CHEMICAL REVIEWS, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 104, no. 2, 29 January 2004 (2004-01-29), pages 849-902, XP002286137 page 873 -----	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

national Application No

T/PT 03/00015

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0560656	A	15-09-1993	DE 69310427 D1	12-06-1997
			DE 69310427 T2	21-08-1997
			EP 0560656 A2	15-09-1993
			JP 5345741 A	27-12-1993
			US 5281752 A	25-01-1994

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